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EXAMINER

LE, HOA T

ART UNIT PAPER NUMBER

1773

DATE MAILED: 10/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/807,914

Applicant(s)

DENES ET AL

Examiner

H. T. Le

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 1-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 38-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>Aug & Sept. 2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 38-50 in the reply filed on September 12, 2005 is acknowledged. Accordingly, claims 1-37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The preamble of the claim recites a carbon-containing surface, but the body of the claim also contains the same carbon-containing surface as the preamble and other components. Thus the subject matter claimed by the claim is unclear.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 38 is rejected under 35 U.S.C. 102(b) as being anticipated by the Noetzel patent (US 4,568,706).

The Noetzel patent teaches a polymeric substrate suitable as a carrier material for biomolecules by binding the surface of the substrate with a spacer. The spacers are epihalohydrin and butanediol diglycidyl ether. See col. 8, line 66 to col. 9, line 14 and col. 9, lines 35-41.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 39-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Noetzel patent (US 4,568,706) in view of the Yang article ("DNA-modified nanocrystalline diamond thin-film as stable, biologically active substrate").¹

Claims 39-44: The Noetzel patent teaches a biomolecular carrier comprising a polymeric substrate and a spacer comprising epihalohydrin and butanediol diglycidyl ether. See Noetzel, col. 8, line 66 to col. 9, line 14 and col. 9, lines 35-41. The Yang article suggests the use of diamond-like as the substrate for a biomolecular carrier. The diamond-like film as nanoparticles is suggested by Yang at p. 253, left column, last two sentences.

Yang states that diamond-like material is "unique in its ability to achieve very high stability and sensitivity while also being compatible with microelectronics processing technologies" (Yang, p. 253, left column). Because of the superiority of diamond substrate as taught by

Art Unit: 1773

Yang, one of ordinary skill in the art would have been motivated to replace the polymeric substrate in the biomolecular carrier taught by Noetzel with a diamond-like substrate. With regard to the spacer chain, the length that would most efficient in binding biomolecules would have been obvious to one ordinary skill in the art through routine experimentation.

Claim 45: The diamond-like film as nanoparticles is suggested by Yang at p. 253, left column, last two sentences.

Claims 46-47: The length of the spacer chain that would most efficient in binding biomolecules would have been obvious to one ordinary skill in the art through routine experimentation.

Claims 48-50: See Noetzel, col. 9, lines 35-41.

8. Claims 39-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Noetzel patent (US 4,568,706) in view of the Dai patent (US 6,528,020).

Claims 39-45: The Noetzel patent teaches a biomolecular carrier comprising a polymeric substrate and a spacer comprising epihalohydrin and butanediol diglycidyl ether. See Noetzel, col. 8, line 66 to col. 9, line 14 and col. 9, lines 35-41. The Dai teaches the use of carbon nanotube as a preferred class of substrate because of its sensitivity to a wide range of chemical and biological species (Dai, col. 1, lines 50-57). Because of the versatility of carbon nanotube substrate as taught by Dai, one of ordinary skill in the art would have been motivated to replace the polymeric substrate in the biomolecular carrier taught by Noetzel with a carbon-nanotube substrate. Carbon nanotube comprises carbon-bond structure that

¹ Copy of this article has been provided by Applicant.

resembles structure and thus it's "diamond-like". With regard to the spacer chain, the length that would most efficient in binding biomolecules would have been obvious to one ordinary skill in the art through routine experimentation.

Claims 46-47: The length of the spacer chain that would most efficient in binding biomolecules would have been obvious to one ordinary skill in the art through routine experimentation.

9. References not relied upon are cited as art of interest.
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. T. Le whose telephone number is 571-272-1511. The examiner can normally be reached on 10:00 a.m. to 6:30 p.m., Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



H. T. Le
Primary Examiner
Art Unit 1773